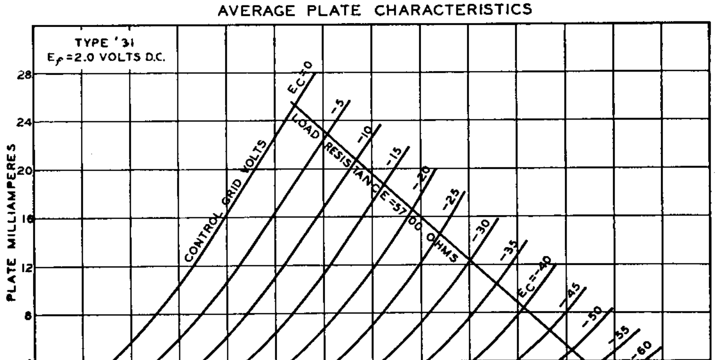
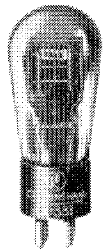
AVERAGE PLATE CHARACTERISTICS





Cunningham RADIO TUBES

CX-331

POWER AMPLIFIER

The '31 is a power amplifier tube of the three-electrode type. It has a coated filament which takes as little power as possible consistent with satisfactory operating performance. This feature makes the '31 particularly suitable in battery-operated radio receivers employing the '30, '32, and/or '34 where economy of filament current drain is important.

CHARACTERISTICS

Filament Voltage (D. C.)		2.0	Volts
Filament Current		0.130	Ampere
Plate Voltage	135	180 *max.*	Volts
Grid Voltage	−22.5	−30	Volts
Plate Current	8.0	12.3	Milliamperes
Plate Resistance	4100	3600	Ohms
Amplification Factor	3.8	3.8	
Mutual Conductance	925	1050	Micromhos
Load Resistance	7000	5700	Ohms
Undistorted Power Output	185	375	Milliwatts
Grid-Plate Capacitance		5.7	μμf.
Grid-Filament Capacitance		3.7	μμf.
Plate-Filament Capacitance		2.2	μμf.
Maximum Overall Length			4¼"
Maximum Diameter			1 9/16"
Bulb (See page 42, Fig. 6)			S-12
Base			Small 4-Pin

INSTALLATION

The **base** pins of the '31 fit the standard four-contact socket. The socket should be installed so that the tube will operate in a vertical position. Although the '31 is very free from microphonic disturbances, cushioning of its socket may be desirable. For socket connections, see page 39, Fig. 1.

The coated **filament** of the '31 may be operated conveniently from dry-cells, from a single lead storage-cell, or from an air-cell battery. For dry-cell operation, a filament rheostat may be used together with a permanently installed voltmeter to insure the proper filament voltage. For operation from a 2-volt lead storage-cell, the '31 requires no filament resistor. Operation with an air-cell battery requires a fixed resistor in the filament circuit. This resistor should have a value such that with a new air-cell battery, the voltage applied across the filament terminals will not initially exceed 2.15 volts. *Series operation of the filaments of these tubes is not recommended.*

APPLICATION

As a **power amplifier,** the '31 should be operated as shown under Characteristics.

Grid voltage for the '31 may be obtained from a C-battery, or by use of the voltage drop in a resistor connected in the negative plate return lead. The latter method is known as the **self-biasing** method and is required where a grid resistor (maximum value 1 megohm) is used.

If more output is desired than can be obtained from a single '31, two '31's may be operated either in parallel or push-pull connection. Average plate characteristics (curves) are given on the preceding page.